

REMARKSSummary Of The Office Action

Claims 20-39 are pending.

Claims 20-39 have been rejected under 35 U.S.C. § 112, first and second paragraphs.

Claims 20-31 and 36-39 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton in view of Carr et al. U.S. Patent No. 5,011,520 ("Carr"). Claims 32-35 have been rejected under 35 U.S.C. § 103(a) as obvious from Barton and Carr in view of Wofford et al. U.S. Patent No. 5,011,520 ("Wofford").

Applicants' Reply

Applicants respectfully traverse the § 112 and the prior art rejections.

§ 112 rejections.

Applicants respectfully note that the § 112 rejections in the Office Action are improper and are not understood. The Office Action states that the claim term "reaction chamber for removing harmful and/or toxic gases" has no written support and is indefinite and inaccurate." This is incorrect.

The undersigned respectfully notes that the specification repeatedly states and describes that applicants' invention is directed to an emission control system "for removing environmentally harmful and/or toxic gases or vapours." The inventive system includes a reaction chamber in which a plasma is used to treat and convert the incoming gases to remove

harmful and/or toxic gases. (See e.g., Abstract, ¶ [0001], ¶ [0012], ¶ [0032], etc.). Thus, the specification describes a reaction chamber “for removing harmful and/or toxic gases or vapours,” as claimed.

To expedite prosecution of this application, applicants, without prejudice, amend the claims replacing the phrase “reaction chamber for removing harmful and/or toxic gases” by the equivalent phrase “reaction chamber for treating and converting harmful and/or toxic gases for their removal and/or disposal.” Explicit written support for the claimed language is found in the specification. (See e.g., Abstract, ¶[0009], ¶[0012], ¶ [0038], etc.).

Applicants respectfully submit that the amended claims conform to all requirements of § 112, first and second paragraphs.

Prior art rejections.

Applicants’ waste gas cleaning system for removing harmful and/or toxic gases from a gas stream, as recited in claim 1, includes:

a reaction chamber for treating and converting harmful and/or toxic gases for their removal and/or disposal,

a plasma source coupled to said reaction chamber; and

a liquid jet pump having a suction tube or port connected to the reaction chamber outlet and generating sufficient negative pressure in said reaction chamber for generating a plasma therein, said liquid jet pump being arranged to draw treated gases . . . out of said reaction chamber mixed with liquid from said liquid jet, wherein the liquid jet pump has a constricted region having a lower pressure that is connected via said suction tube or port to said reaction chamber to provide vacuum drawing power or suction on said reaction chamber.

Claim 39 further requires that the liquid jet pump is “further arranged to generate a sufficient negative pressure in said reaction chamber for ignition of said plasma and to further arranged to maintain said negative pressure during plasma treatment of the received gas stream for removing harmful and/or toxic gases therefrom.”

For brevity, applicants do not reproduce, but incorporate by reference the Remarks presented in their previous Replies (See e.g., Replies mailed December 14, 2006, September 8, 2006, April 25, 2006, etc.). Applicants request the Examine kindly reconsider the Remarks presented in the previous Replies.

With reference to the cited prior art, Barton describes a plasma pyrolysis system. Carr describes a fume water scrubber. However, as previously presented, Barton and Carr, even when viewed in combination, do not show the elements of applicants’ claims 1 and 39. In particular the combination of Barton and Carr does not show, teach or suggest: a waste gas conversion system having (1) a reaction chamber for treating and converting harmful and/or toxic gases for their removal and/or disposal, (2) a plasma source coupled to the reaction chamber for that purpose; (3) a liquid jet pump to provide vacuum drawing power or suction on the reaction chamber, (3a) wherein the pump is connected to the reaction chamber outlet and (3b) generating sufficient negative pressure in said reaction chamber for generating a plasma therein.

Here, applicants again note that the present Office Action at §3 page 3 mistakenly identifies Barton’s spray nozzles (94) as a liquid jet pump as recited in applicant’s claims. The Office Action at §3 page 4 states that “the spray nozzle appear to constitute a liquid jet pump” for creating negative pressure. Applicants respectfully submit that this conclusion is technically incorrect and is not supported by Barton’s disclosure.

There is no disclosure or suggestion in Barton of a liquid jet pump. Applicants have in the previous Reply described the principles of the Venturi Effect, which is used in liquid jet pumps. As previously noted, careful reading of Barton indicates that Barton uses a mechanical induction fan 20 to maintain slight negative pressure in the system. (See Barton, col. 6 lines 31-37). There is no technical or other reasonable basis for the Office Action to assume that Barton's system creates negative pressure using spray nozzles (94). As previously noted, Barton's spray nozzles 94 are for atomizing a quenching liquid spray to form droplets. (See Barton, col. 5 lines 5-31-37). Further, neither Barton's spray arrangement nor his induction mechanical fan create vacuum sufficient to ignite a plasma (e.g. 10 mbar to 30 mbar as described in applicants' specification ¶ [0034]).

Applicants respectfully submit that the Office Action uses impermissible hindsight to ascribe features of applicants' invention to Barton and/or Carr.

As previously noted, Carr merely describes a hydrodynamic fume scrubber, i.e. a water scrubber. The Examiner now agrees that Carr's reaction process 16 is not a reaction chamber. (See Office Action, page 7). However, the Office Action now states "Barton discloses all the features of the claimed invention including reaction chamber (14) and a liquid jet pump (94). The only feature missing in the Barton reference is a constricted region of the a liquid jet pump."

Again, this is a technically incorrect reading of Barton. As described above, Barton does not describe or suggest using his atomizer spray as a "vacuum pump" of any sort, but on the contrary describes the atomizer spray for making water droplets in the gas. Further, the Office Action fails to describe how to construct a liquid jet pump from Barton's water atomizer (apart from incorrectly stating that the only feature missing in the Barton reference is a

constricted region). Applicants respectfully submit that a person of ordinary skill in the art will recognize that arbitrary or wishful imposition of a constricted region in Barton's water atomizer will only interfere with the atomizer functions. Further, Carr does not provide any useful suggestions on how to modify Barton. In fact, Carr teaches the wrong orientation of the constricted region for applicants' liquid jet pump.

In the previous Reply, applicants have pointed out that Carr's configuration does not constitute a liquid jet pump of the claimed invention. Carr's co-axial Venturi orientation is contrary to applicants' perpendicular liquid jet pump arrangement (FIG. 1) and does not create sufficient suction to draw from an upstream reaction chamber (or process 12) via conduit 14, or maintain sufficiently low pressures for generating a plasma therein.

Applicants, in particular, again note that there is no teaching or suggestion in Carr of a liquid pump jet arrangement for "generating negative pressure in said [waste treatment] reaction chamber for generating a plasma therein" as required by claim 20, and "further arranged to maintain said negative pressure during plasma treatment of the received gas stream for removing harmful and/or toxic gases therefrom," as required by claim 39.

Thus, Carr like Barton does not to show, teach or suggest using a liquid jet pump located at the outlet of a plasma [waste treatment] reaction chamber to draw waste or treated gases out of the plasma processing reaction chamber having the features recited in claims 20 and 39. Therefore, claims 20 and 39 are patentable over the cited references — Barton and Carr, whether they are viewed individually or in combination.

Dependent claims 21-38

Dependent claims 21-38 are patentable over the cited references — Barton and Carr, for at least the same reasons that parent claim 20 is patentable over these references.

Conclusion

Applicants respectfully submit that this application is now in condition for allowance. Reconsideration and prompt allowance of which are requested.

Applicant respectfully requests that the Examiner should kindly contact the undersigned attorney for a telephone interview in case there remain any outstanding issues.

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